

**CLAIMS**

What is claimed is:

1. An isolated and purified  $\alpha$ -N-acetyl-D-galactosaminidase from *Clostridium perfringens* and homologs thereof.
2. The isolated and purified  $\alpha$ -N-acetyl-D-galactosaminidase from *Clostridium perfringens* as set forth in claim 1 further characterized by being a homogenous preparation and having protease activity below detectable limits.
3. The isolated and purified  $\alpha$ -N-acetyl-D-galactosaminidase from *Clostridium perfringens* as set forth in claim 2 further characterized by
  - a) having a molecular weight of approximately 72.1kDa by SDS-PAGE and approximately 57.5 kDa by molecular sieve chromatography;
  - b) being homogenous by SDS-Page;
  - c) having specific activity of approximately 40.54 U mg<sup>-1</sup> min<sup>-1</sup> using PNP-N-acetyl- $\alpha$ -D-galatosaminide as a substrate and BSA as a protein standard in a BioRad Protein assay; and
  - d) having an approximate pH optimum of 6.5 to 7.0.
4. The isolated and purified  $\alpha$ -N-acetyl-D-galactosaminidase from *Clostridium perfringens* according to claim 1, wherein said  $\alpha$ -N-acetyl-D-galactosaminidase has a sequence selected from the group consisting essentially of SEQ ID Nos:1, and 8-16.
5. A method for removing neuramidases from  $\alpha$ -N-acetylgalactosaminidase

isolated from *Clostridium perfringens*.

6. The method as set forth in claim 2 wherein the removal step further includes the removal of other impurities.
7. A process for altering erythrocytes by using  $\alpha$ -N-acetyl-D-galactosaminidase isolated from *Clostridium perfringens* or homologs thereof in altering erythrocytes to type O blood cells.
8. The process as set forth in claim 7, wherein said altering step further includes degrading the type A blood cells thereby creating the type O blood cells.
9. A recombinant  $\alpha$ -N-acetyl-D-galactosaminidase as set forth in SEQ ID No:1 and 8-15 and functional analogs thereof.
10. An antibody for testing the purity of  $\alpha$ -N-acetylgalactosaminidase isolated from *Clostridium perfringens*.
11. A process for altering cells expressing blood group A epitope by using  $\alpha$ -N-acetylgalactosaminidase isolated from *Clostridium perfringens* in altering the cells expressing blood group A epitope to cells expressing blood group O epitope.
12. A process for altering cells expressing blood group A epitope by using  $\alpha$ -N-acetylgalactosaminidase isolated from *Clostridium perfringens* in altering the cells expressing blood group A epitope to cells expressing blood group B epitope.